Remarks

Reconsideration is respectfully requested in light of the foregoing amendments and remarks which follow.

Claims 1-8 are pending in this application. Claim 2 has been amended to include a product recovery step and to more clearly define the nature of the mechanical treatment.

The Examiner is thanked for the advice and the courtesies extended during the telephonic interview held on May 27, 2008. The substance of the interview as reflected on the PTOL-413 form is accurate and complete description of the substance of the interview.

Claims 1 and 2 are rejected under 35 U.S.C. 102(b) as being anticipated by Bergstrom et al. (US Patent 6,384,125) and further evidenced by Griffith et al (US Patent 5,908,660) and Burns et al. (US Patent 6,051,672). Applicants respectfully traverse.

Claim 1 requires the product to be a silanized structurally modified pyrogenically produced silica that has as one of its characteristics a DBP value % of less than < 200 or not determinable.

Claim 2 is directed to a process of preparing the product described in claim 1 from a pyrogenically produced silica. The pyrogenically produced silica is mixed with a surface modifying agent, heat treated and then subjected to mechanical action to destructure the pyrogenic silica.[1]

Bergstrom et al. teach a process for the preparation of a neutralized modified silica prepared from precipitated or colloidal silica.[2] There is no mention of a step, e.g. ball mill

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[1] Please note Table 3 appearing on page 11 of the specification. Note, in particular, the "compacted bulk density" and "DBP" values for the comparative silica relative to those of Sil 1-11. Please also consider Nargiello et al (US 6,193,795 B1) directed to the preparation of low structure pyrogenic metal oxides. Figures 1-3 illustrate the influence of destructuring on DBP absorption, agglomerate size and bulk density. Hydrophobizing is mentioned, in particular, the paragraph starting on line 16 in col.6 and the paragraph starting on line 20 in col. 9.

[2] Precipitated and colloidal silica are distinct forms of silica relative to pyrogenic silica and each other. See Figure 21 on page 37 of "Silica", Ullmann's Encyclopedia of Industrial Chemistry, (2207) Wiley-VCH Verlag GmbH & Co. KGaA,

treatment, which would cause a low structure to be formed. There is no mention of pyrogenic silica as a starting material.[3]

Since neither the starting material nor the processing steps are taught by Bergstrom et al., there is no anticipation. Further since the processing steps taught by Bergstrom et al. are so distinct from those claimed, there is no reasonable expectation that the Bergstrom et al. product would be the same or similar to that claimed.

Griffith et al. or Burns et al., cited as evidence, do not establish the inherent presence of the characteristics required by the claims.

Burns et al. do not mention pyrogenically produced silica. Griffith et al. only mention pyrogenic silica in the background section as having "crepe hardening" issues associated with its use as a filler. See col. 1. Such teachings do not establish that Bergstrom et al. as inherently anticipating either the product or process claims.

Since neither the source material nor the process as claimed is taught, expressly or inherently, there is no anticipation. Withdrawal of the rejection is respectfully requested.

Claims 1-8 are rejected under 35 U.S.C. 102(b) as being anticipated by Barthel et al. (US Application 2003/0138715) and further evidenced by Scharfe et al. (US Application 2003/0118499) and Mangold et al. (US Patent 5,976,480). Applicants respectfully traverse.

Claim 1 is directed to a silanised, structurally modified pyrogenically produced silica characterized by vinyl groups or vinyl silyl groups fixed to the surface, hydrophobic groups such as trimethyl silyl and/or dimethyl silyl and/or monomethyl silyl additionally being fixed to the surface. Claims 2-6 and 8 are directed to a process for its preparation. Claim 2, as amended, requires the recovery of the product described in claim 1. Claim 7 is directed to silicone rubber

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Weinheim 10.1002/14356007.a23_583.pub2. The expectation is that these distinct form of silica would result in distinct products even though they all comprise silica. The physical forms are quite distinct.

[3] Cabot MS75D is mentioned in Table 3 and Table 5 as controls. The invention of Bergstrom is distinguished there over.

containing as a filler the silanised, structurally modified pyrogenically produced silica of claim 1. Tear resistance and vulcanization behavior are improved by the presence of the claimed filler.

The Barthel et al. teach the preparation of a low surface silanol-content silica by a multistage process. The starting silica material is loaded with the silylating agent[4] at a lower temperature (paragraphs 50-57), the reaction proceeds at a higher temperature (paragraphs 58-60) and then the silylated product is purified (paragraphs 61-63). There is no mention of a step which would destructure the pyrogenic silica.[5] While Barthel et al. mention the use of mixtures of silylating agents, Barthel et al. do not teach mixtures of surface modifying agents that would lead to the claimed mixture of vinyl and hydrophobic groups. Further, while the Barthel et al. starting material is pyrogenic silica (paragraphs 18-25), there is no description of a structurally modified pyrogenic silica or process conditions which would result in the formation of a "low structure" pyrogenically produced silica.[6] The Exemplified use for the Barthel et al product is as a "toner". The claimed product is shown to have a high compacted bulk density due to the structural modification. See Table 3 on page 13 of the specification. It is not clear that a high compacted bulk density is desired in a toner product. Such a use further distinguishes the products.

Scharfe et al and Mangold et al. are cited as evidentiary references to establish the inherent anticipation of the claimed invention. Neither reference establishes the inherent presence of claimed step c) in Barthel et al. process, the mixture of surface modifying agents employed by Applicants or structural modification of the pyrogenic silica starting material.

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[4] A silylating agent is an organosilicon compound that replaces an activated hydrogen in an organic molecule with an organosilicon group.

[5] Nargiello et al (US 6,193,795 B1) teach at col.2 starting at line20 that the grinding process of the present invention is an intensive milling process which goes beyond standard particle size reduction to achieve destructuring of pyrogenic metallic oxides. The lowering of the structure of the pyrogenic metallic oxide is a function of the time of compression, the amount of compressive force exerted on the aggregate/agglomerate particles and the conditions of compression. There are instances where mechanical compaction only effects bulk density but not DBP values. See paragraph bridging col. 7 and 8.

[6] There are no processing steps disclosed in Barthel et al. which are akin to those claimed. Disclosed in the instant specification which suggest the possibility inherent structural modification- spray drying of pyrogenic silica followed by heat treatment, followed by a ball milling-type process to complete the structural modification. See Table 3 which shows a clear change in physical characteristics for the claimed product.

There is no anticipation of the product or process claimed since Barthel et al. does not teach each and every element required by the claim, expressly or inherently.[7] Barthel et al does not teach claim 2 step c). Barthel et al does not teach a silanized structurally modified pyrogenic silica (note Table 3). Barthel et al. do not teach surface modifying agents that would lead to the claimed mixture- both vinyl and hydrophobic groups. Withdrawal of the rejection is respectfully requested.

In view of the foregoing amendments and remarks, the application is believed to be in condition for allowance and a notice to that effect is respectfully requested.

Should the Examiner not find the Application to be in allowable condition or believe that a conference would be of value in expediting the prosecution of the Application, Applicants request that the Examiner telephone the undersigned Counsel to discuss the case and afford Applicants an opportunity to submit any Supplemental Amendment that might advance prosecution and place the Application in allowable condition.

Respectfully submitted,

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[7] Please consider Nargiello et al. (US Patent 6193795), where a method of producing a low structure pyrogenic metal oxide filler by subjecting metal oxide agglomerates to a dry milling process is taught. The characteristics imparted by the structural modification are illustrated in Figures 1-3. There are no teachings in Scharfe et al. or Mangold et al., which are analogous to those provided in the '795 patent or the instant specification relative to structural modifications to pyrogenically produced silica due to mechanical action.

ATTACHMENT A

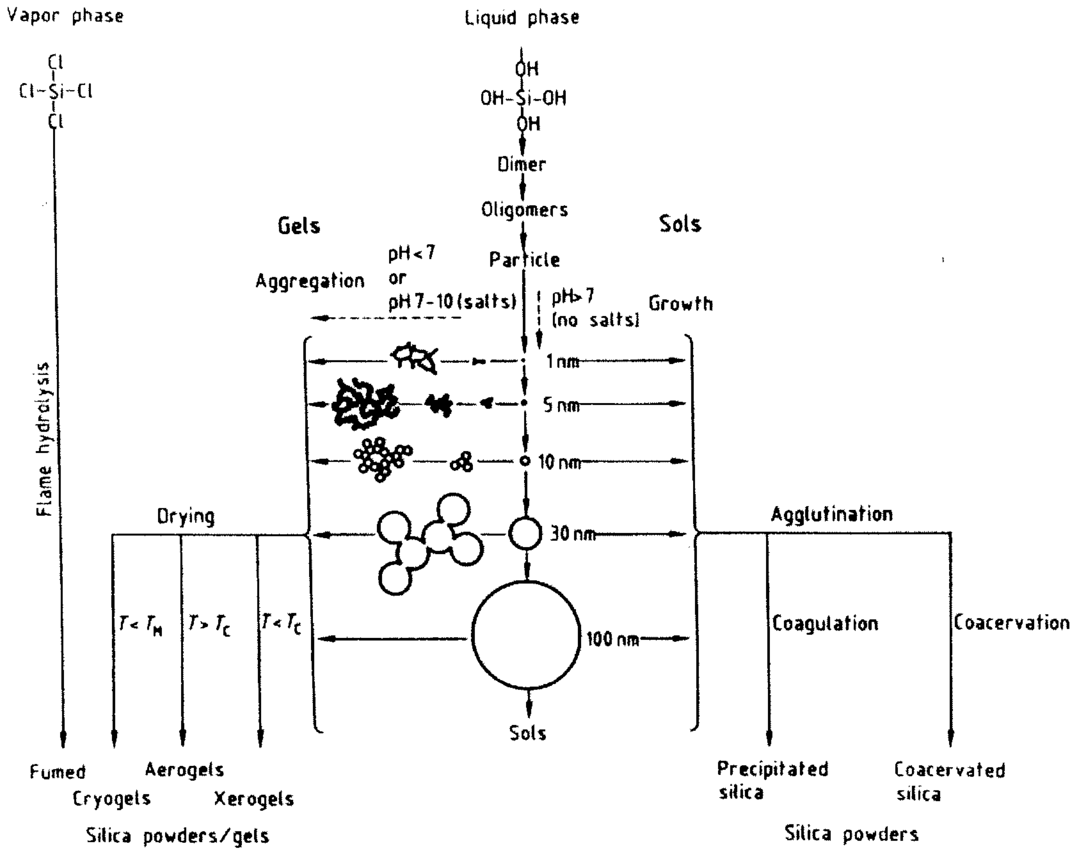

Figure 21. Formation of silica sols, gels, and powders by silica monomer condensation–polymerization followed by aggregation or agglutination and drying [233]
Growth of nascent colloidal particles with decrease in numbers occurs in basic solutions in the absence of salts. In acid solutions or in the presence of flocculating sols the colloidal silica particles form gels by aggregation into three-dimensional networks. Aerogels are made by drying wet gels under supercritical conditions, that is, above the critical temperature T_C and critical pressure of the liquid. Cryogels are made by drying wet gels below the melting temperature T_M of the liquid. Fumed or pyrogenic silicas are formed at high temperature by flame oxidation–hydrolysis of silicon halides

colloidal silica to be used in a wide variety of applications. Major uses are in investment casting, silicon-wafer polishing, and fibrous ceramics.

4.2. Structure of Colloidal Silica Particles

The building block of silica is the SiO_4 tetrahedron, four oxygen atoms at the corners of a regular tetrahedron with a silicon ion at the central cavity or centroid [240] (see Chap. 1). The oxygen ion is so much larger than the Si^{4+} ion that the four oxygens of a SiO_4 unit are in mutual contact and the silicon ion is said to occupy a tetrahedral hole [240]. In amorphous silica the bulk structure is determined, as opposed to the crystalline silicas, by a random packing of $[SiO_4]^{4-}$ units, which results in a nonperiodic structure (see Fig. 22). As a result of this structural difference amorphous silica has a lower density than the crystalline silicas: 2.2 g/cm^3 versus 3.01, 2.65, 2.26, and 2.21 g/cm^3 for coesite, α-quartz, β-tridymite and β-cristobalite, respectively.

Figure 23 represents a two-dimensional random network of a dehydrated but fully hydroxylated amorphous silica particle.